This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

Fig.1.

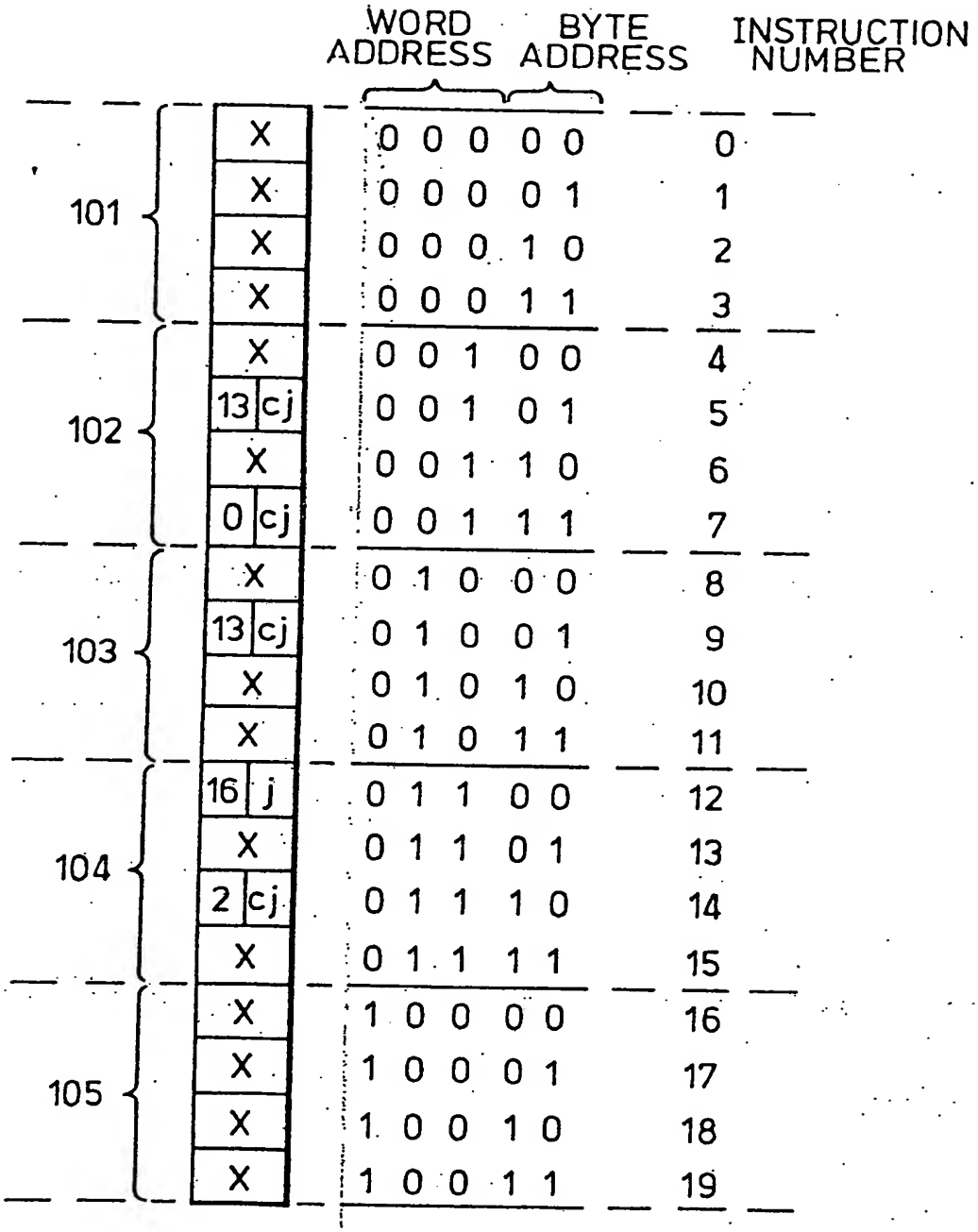
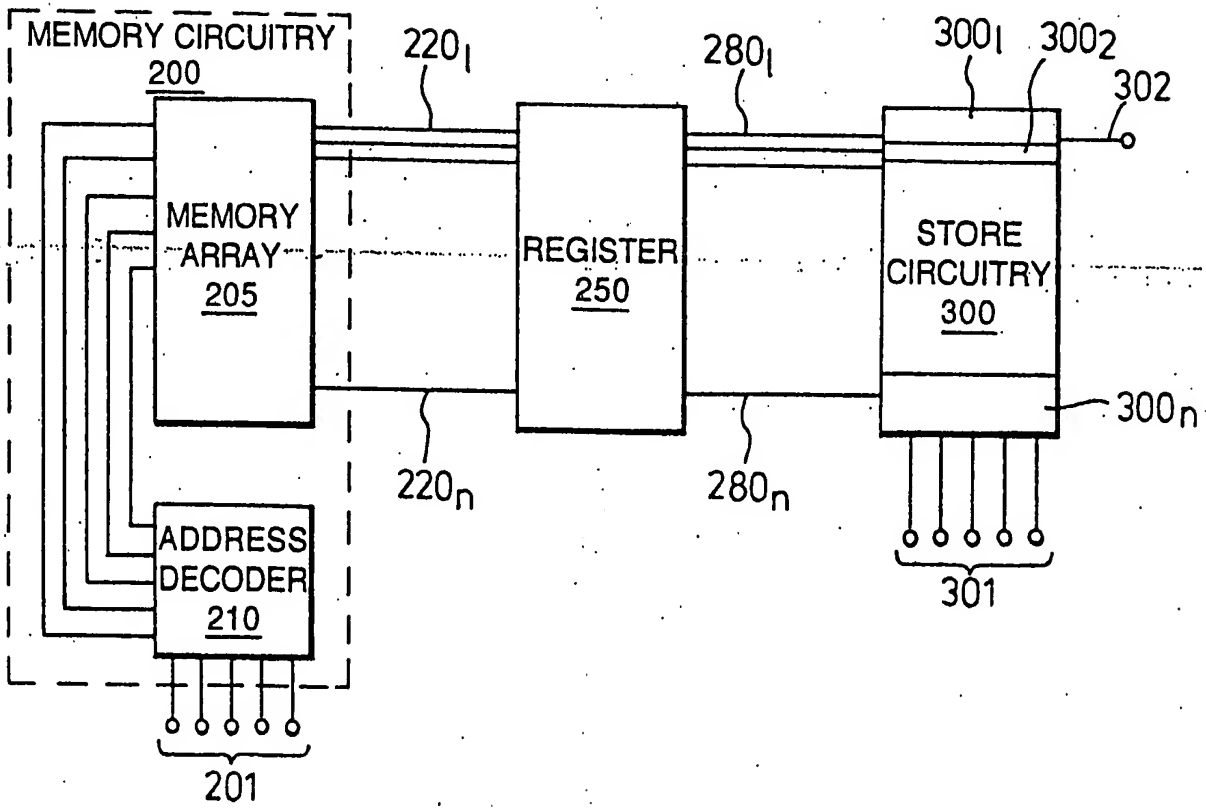

WORD ADDRESS
BYTE ADDRESS
INSTRUCTION NUMBER
101
102
103
104
105
X
13 cj
0 cj
16 j
2 cj
0 0 0 0 0 0
0 0 0 0 1 1
0 0 0 1 0 2
0 0 0 1 1 3
0 0 1 0 0 4
0 0 1 0 1 5
0 0 1 1 0 6
0 0 1 1 1 7
0 1 0 0 0 8
0 1 0 0 1 9
0 1 0 1 0 10
0 1 0 1 1 11
0 1 1 0 0 12
0 1 1 0 1 13
0 1 1 1 0 14
0 1 1 1 1 15
1 0 0 0 0 16
1 0 0 0 1 17
1 0 0 1 0 18
1 0 0 1 1 19

Fig.2.


MEMORY CIRCUITRY
200
MEMORY ARRAY
205
ADDRESS DECODER
210
201
220l
220n
REGISTER
250
280l
280n
3001
3002
302
STORE CIRCUITRY
300
300n
301

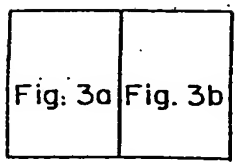


Fig. 3a
Fig. 3b

Fig. 3

Fig. 3a

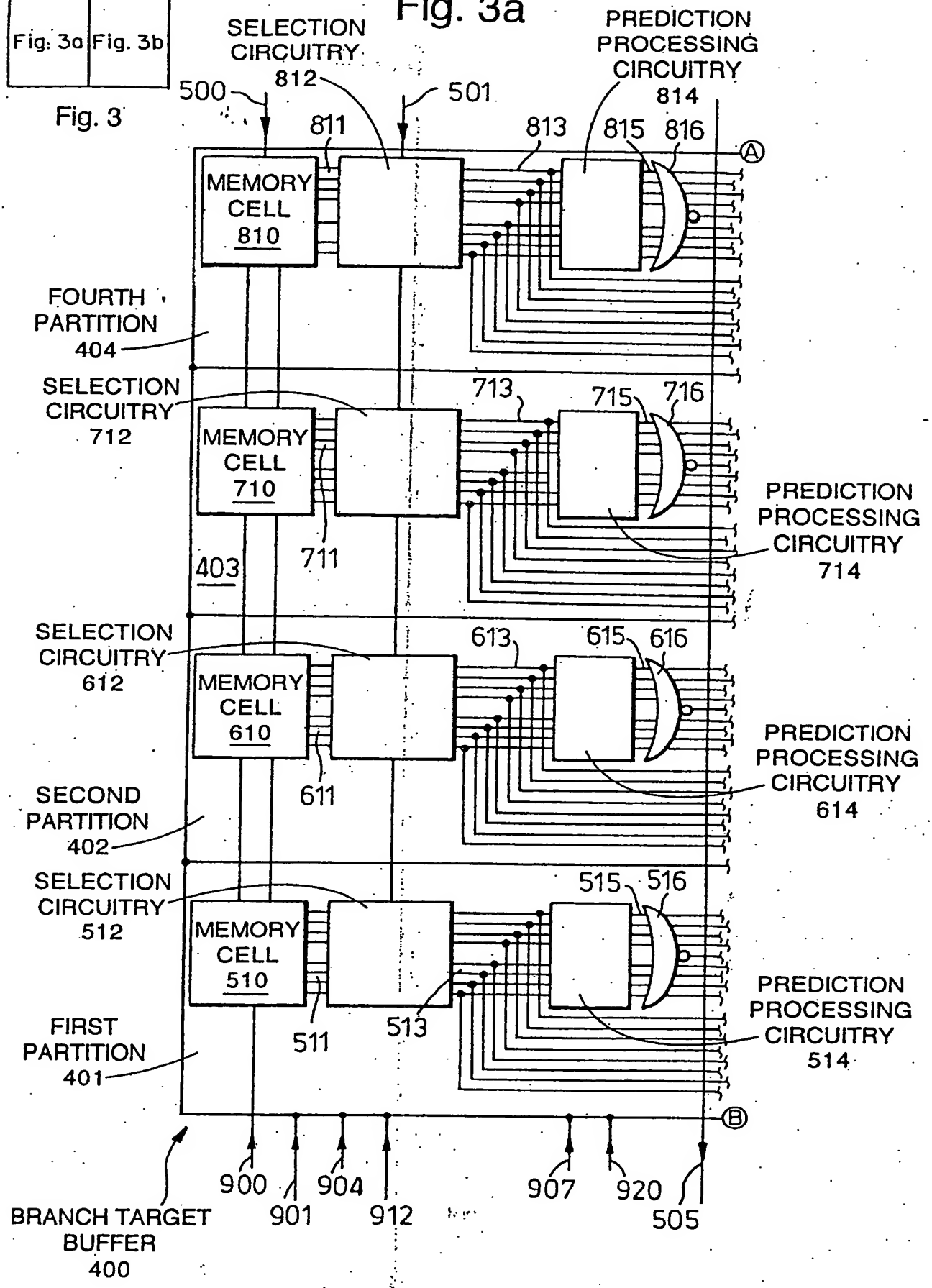

SELECTION CIRCUITRY
812
500
501
811
813
PREDICTION PROCESSING CIRCUITRY
814
815
816
A
MEMORY CELL
810
FOURTH PARTITION
404
SELECTION CIRCUITRY
712
713
715
716
MEMORY CELL
710
711
403
PREDICTION PROCESSING CIRCUITRY
714
SELECTION CIRCUITRY
612
613
615
616
MEMORY CELL
610
611
PREDICTION PROCESSING CIRCUITRY
614
SECOND PARTITION
402
SELECTION CIRCUITRY
512
515
516
MEMORY CELL
510
511
513
PREDICTION PROCESSING CIRCUITRY
514
FIRST PARTITION
401
B
900
901
904
912
907
920
505
BRANCH TARGET BUFFER
400

Fig. 3b

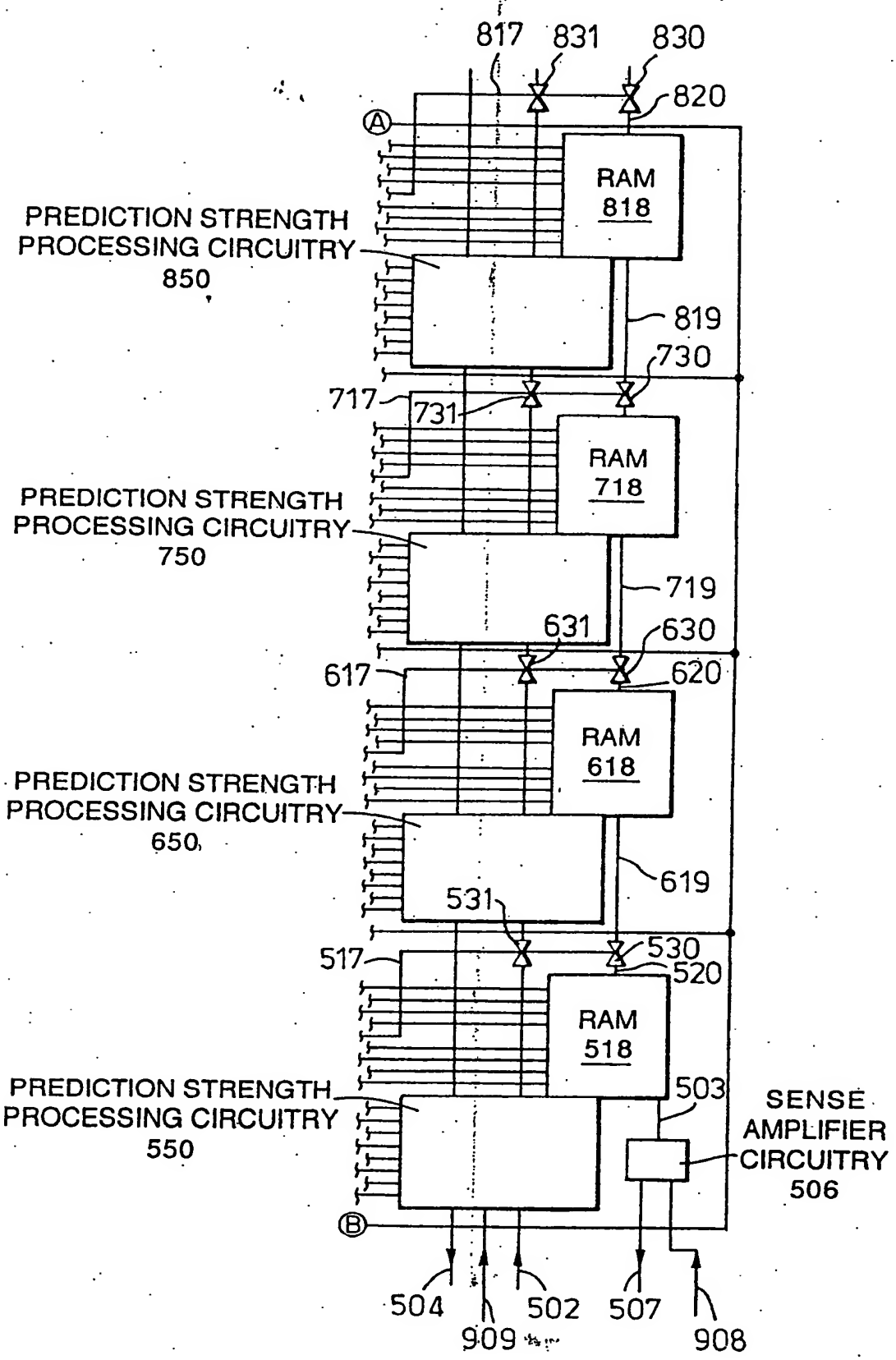
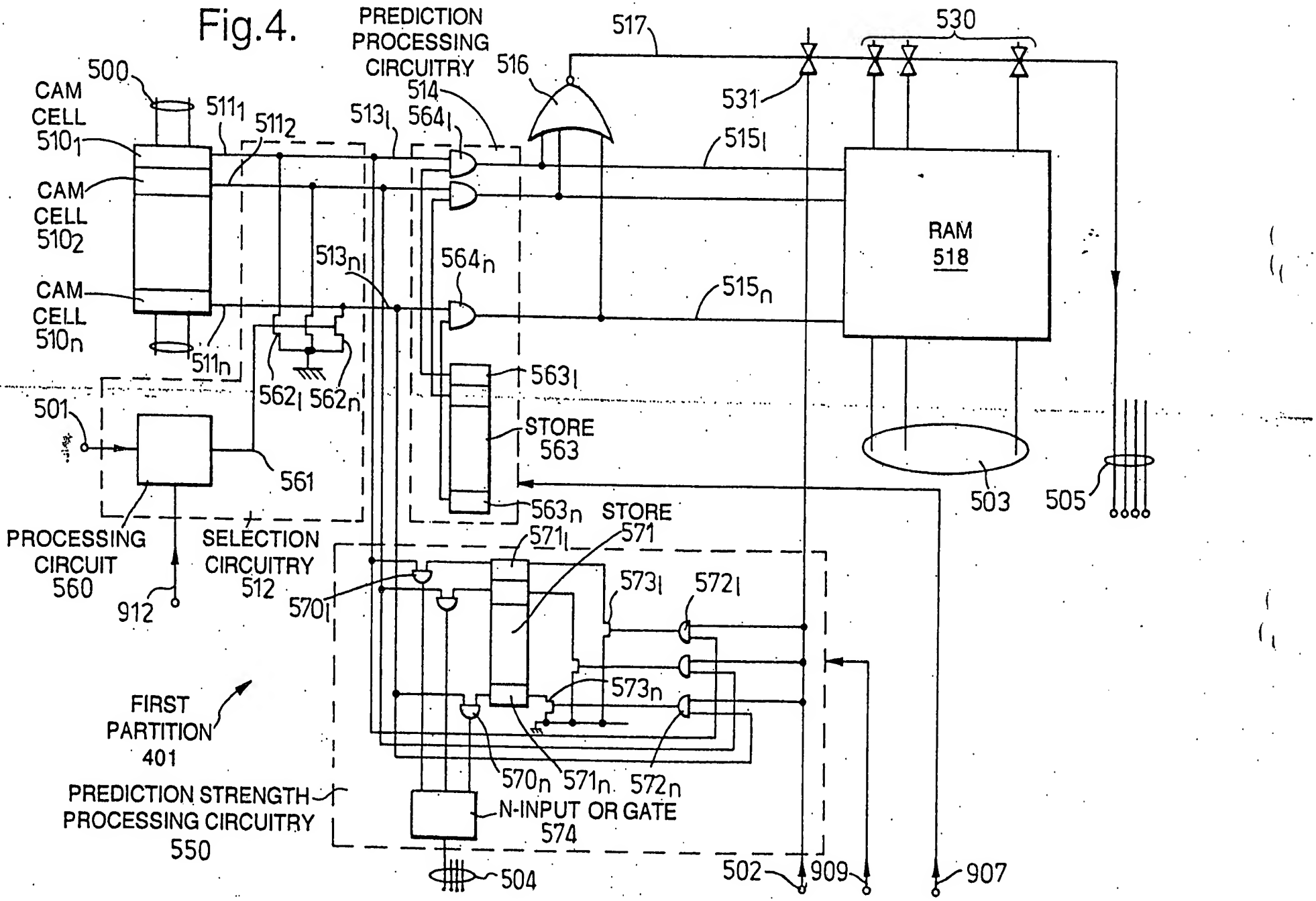

817
831
830
820
Ⓐ
RAM
818
PREDICTION STRENGTH
PROCESSING CIRCUITRY
850
819
730
717
731
RAM
718
PREDICTION STRENGTH
PROCESSING CIRCUITRY
750
719
631
630
617
620
RAM
618
PREDICTION STRENGTH
PROCESSING CIRCUITRY
650
619
531
530
517
520
RAM
518
503
PREDICTION STRENGTH
PROCESSING CIRCUITRY
550
SENSE
AMPLIFIER
CIRCUITRY
506
Ⓑ
504
909
502
507
908

Fig.4.


PREDICTION PROCESSING CIRCUITRY
517
530
500
516
531
CAM CELL 510₁
5111
5112
513₁
514
564₁
515₁
CAM CELL 510₂
RAM 518
513n
564n
515n
CAM CELL 510n
511n
562₁ 562n
563₁
501
STORE 563
561
563n
STORE
503
505
PROCESSING CIRCUIT 560
SELECTION CIRCUITRY 512
571₁
571
912
570₁
573₁
572₁
573n
FIRST PARTITION 401
PREDICTION STRENGTH PROCESSING CIRCUITRY 550
570n 571n 572n
N-INPUT OR GATE 574
504
502
909
907

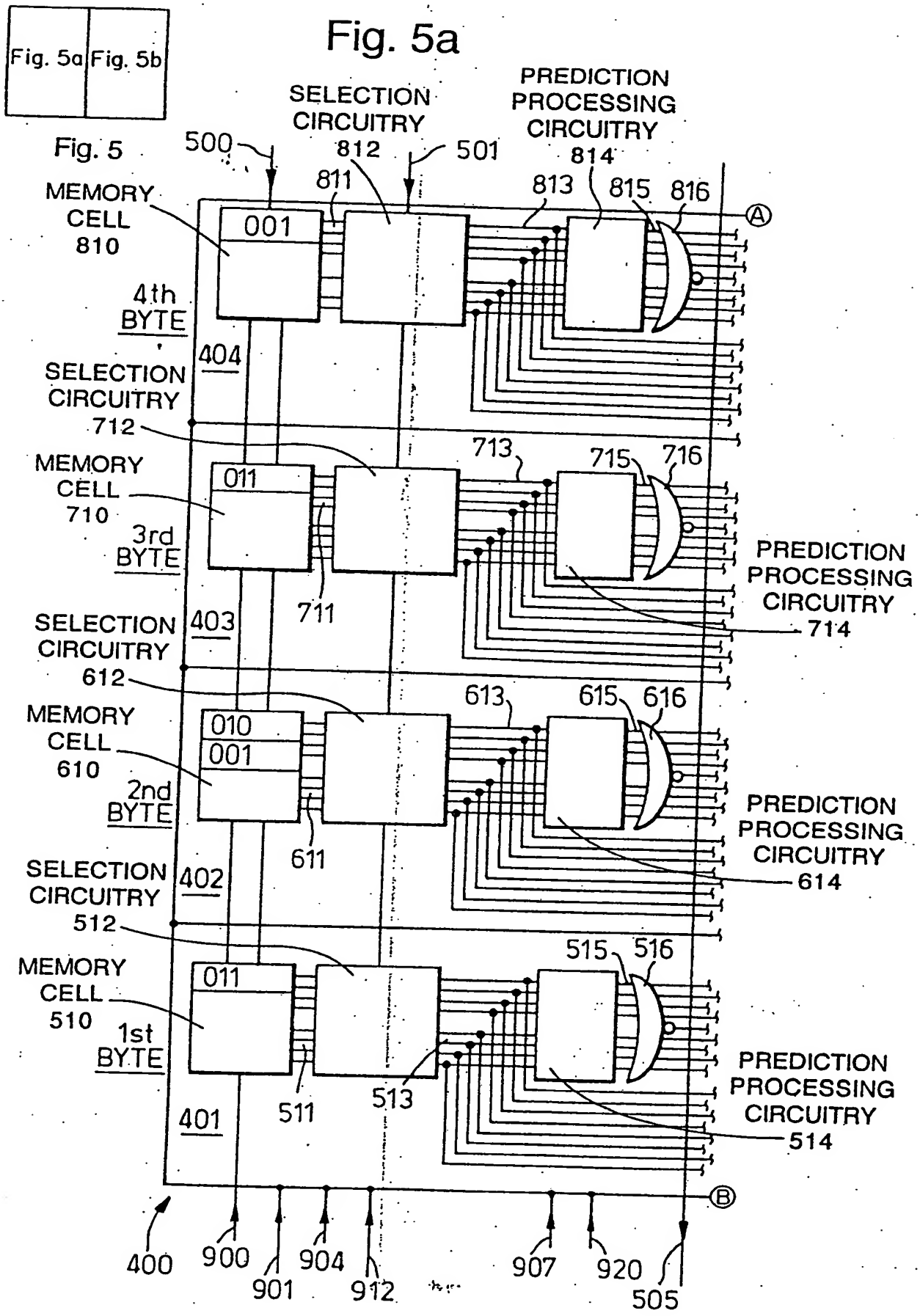


Fig. 5a
Fig. 5a
Fig. 5b
Fig. 5
SELECTION CIRCUITRY 812
PREDICTION PROCESSING CIRCUITRY 814
500
501
811
813
815
816
MEMORY CELL 810
001
4th BYTE
404
SELECTION CIRCUITRY 712
MEMORY CELL 710
011
3rd BYTE
711
713
715
716
PREDICTION PROCESSING CIRCUITRY 714
SELECTION CIRCUITRY 403
SELECTION CIRCUITRY 612
MEMORY CELL 610
010
001
2nd BYTE
611
613
615
616
PREDICTION PROCESSING CIRCUITRY 614
SELECTION CIRCUITRY 402
SELECTION CIRCUITRY 512
MEMORY CELL 510
011
1st BYTE
511
513
515
516
PREDICTION PROCESSING CIRCUITRY 514
401
400
900
901
904
912
907
920
505
A
B

Fig. 5b

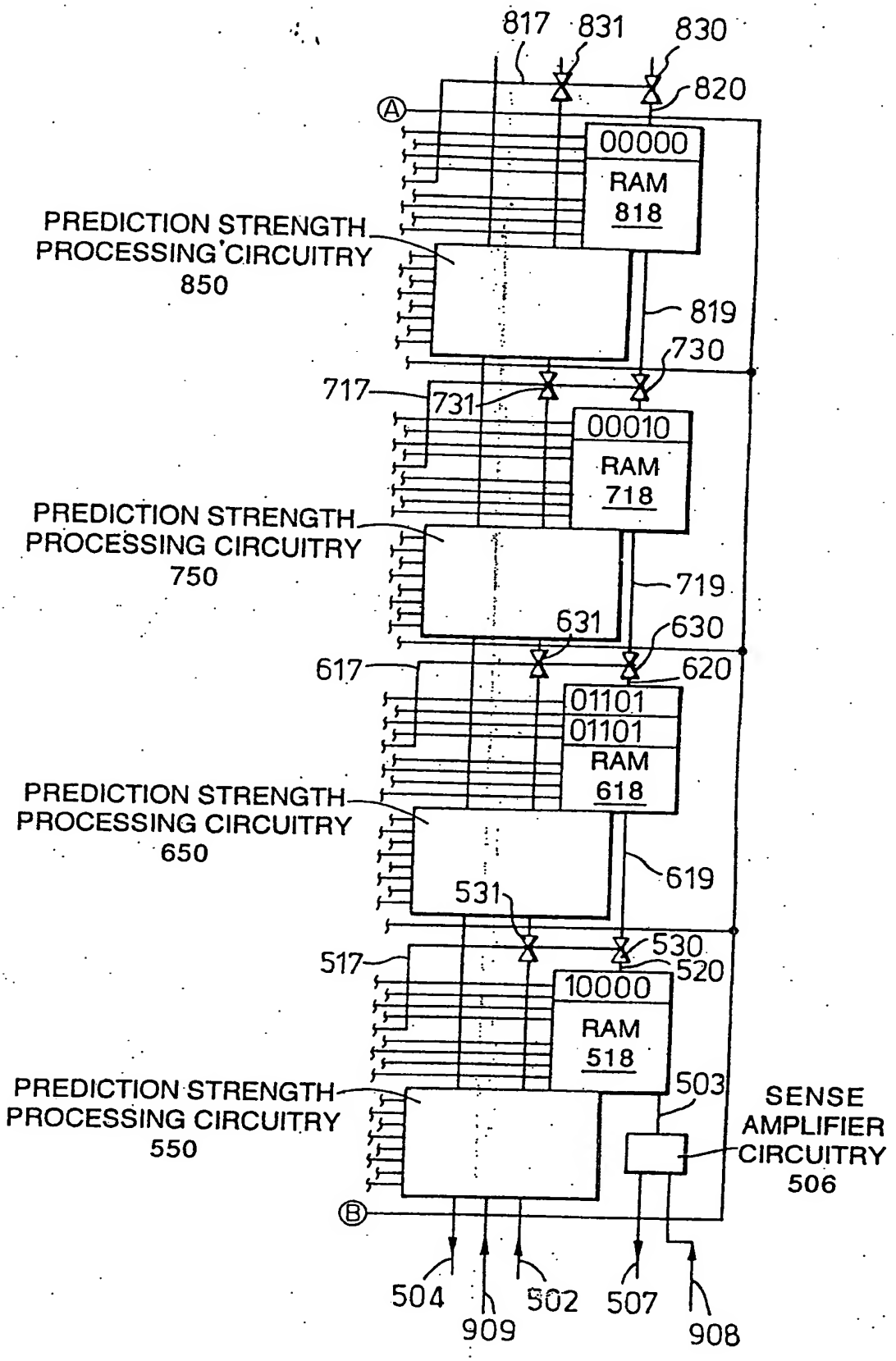

817
831
830
820
Ⓐ
00000
RAM
818
PREDICTION STRENGTH
PROCESSING CIRCUITRY
850
819
730
717
731
00010
RAM
718
PREDICTION STRENGTH
PROCESSING CIRCUITRY
750
719
631
630
617
620
01101
01101
RAM
618
PREDICTION STRENGTH
PROCESSING CIRCUITRY
650
619
531
530
517
520
10000
RAM
518
503
PREDICTION STRENGTH
PROCESSING CIRCUITRY
550
SENSE
AMPLIFIER
CIRCUITRY
506
Ⓑ
504
909
502
507
908

Fig.6.

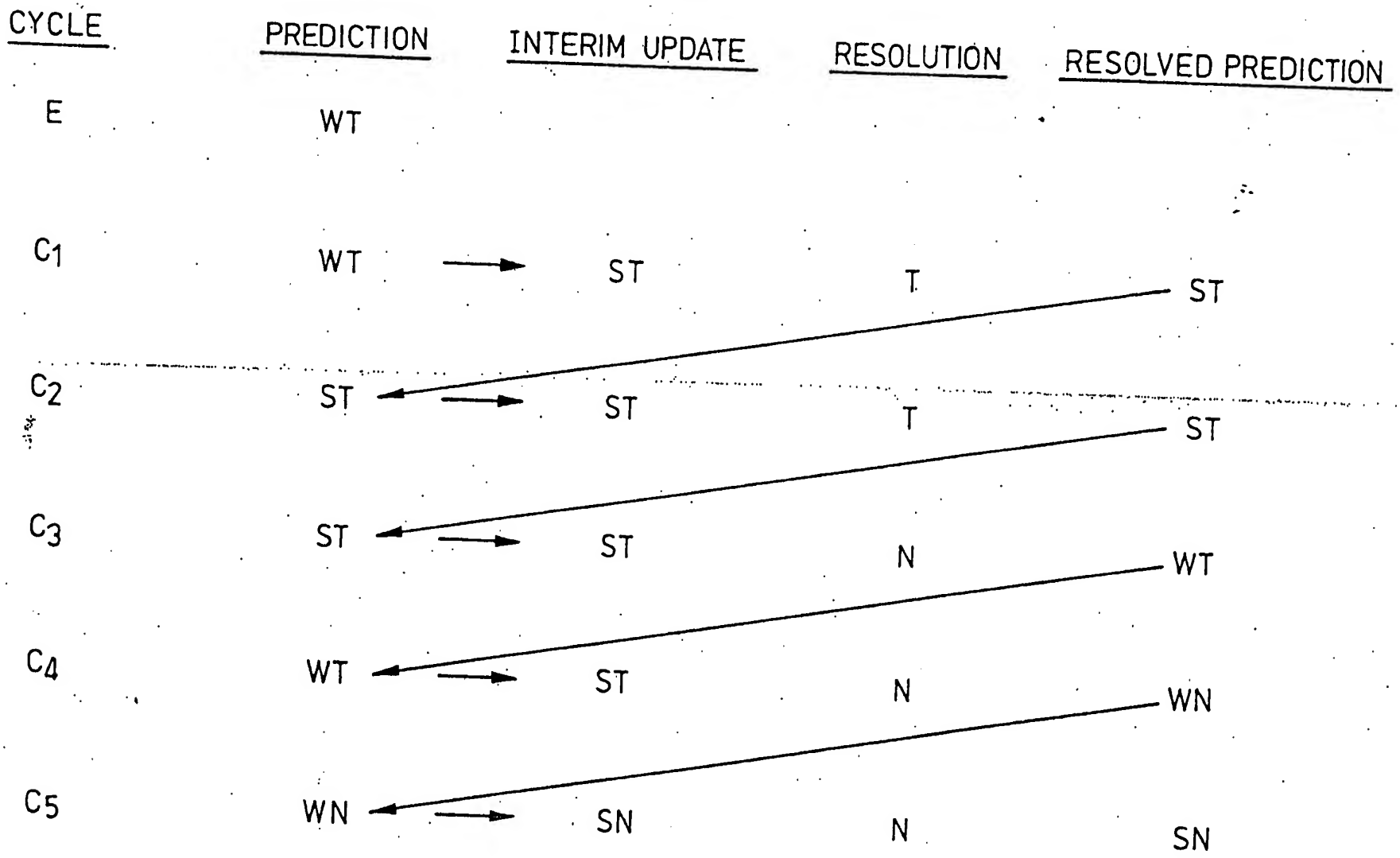

CYCLE
PREDICTION
INTERIM UPDATE
RESOLUTION
RESOLVED PREDICTION
E
WT
C1
WT
ST
T
ST
C2
ST
ST
T
ST
C3
ST
ST
N
WT
C4
WT
ST
N
WN
C5
WN
SN
N
SN

Fig.7.

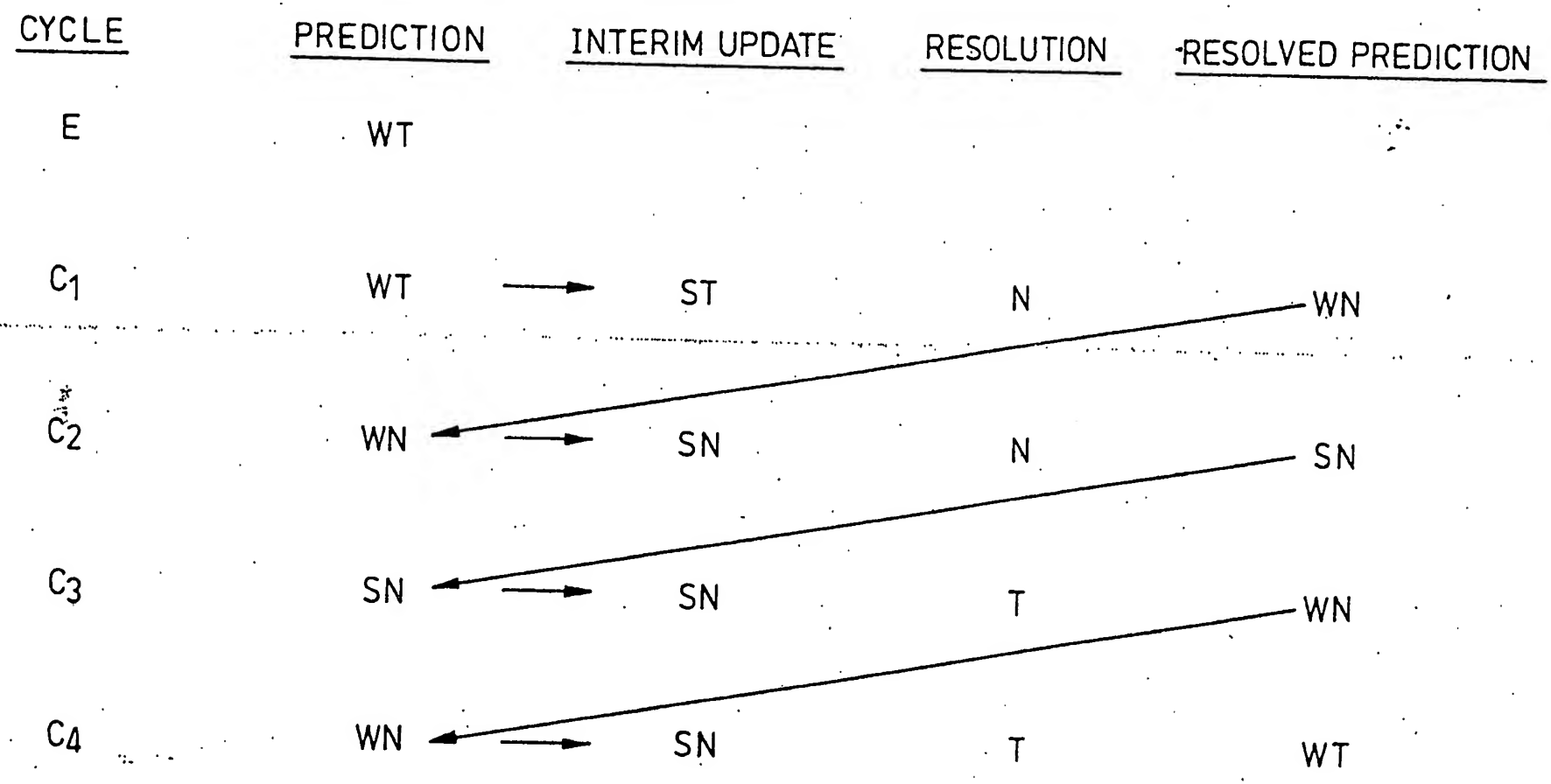

CYCLE
PREDICTION
INTERIM UPDATE
RESOLUTION
RESOLVED PREDICTION
E
WT
C1
WT
ST
N
WN
C2
WN
SN
N
SN
C3
SN
SN
T
WN
C4
WN
SN
T
WT

Fig.8.

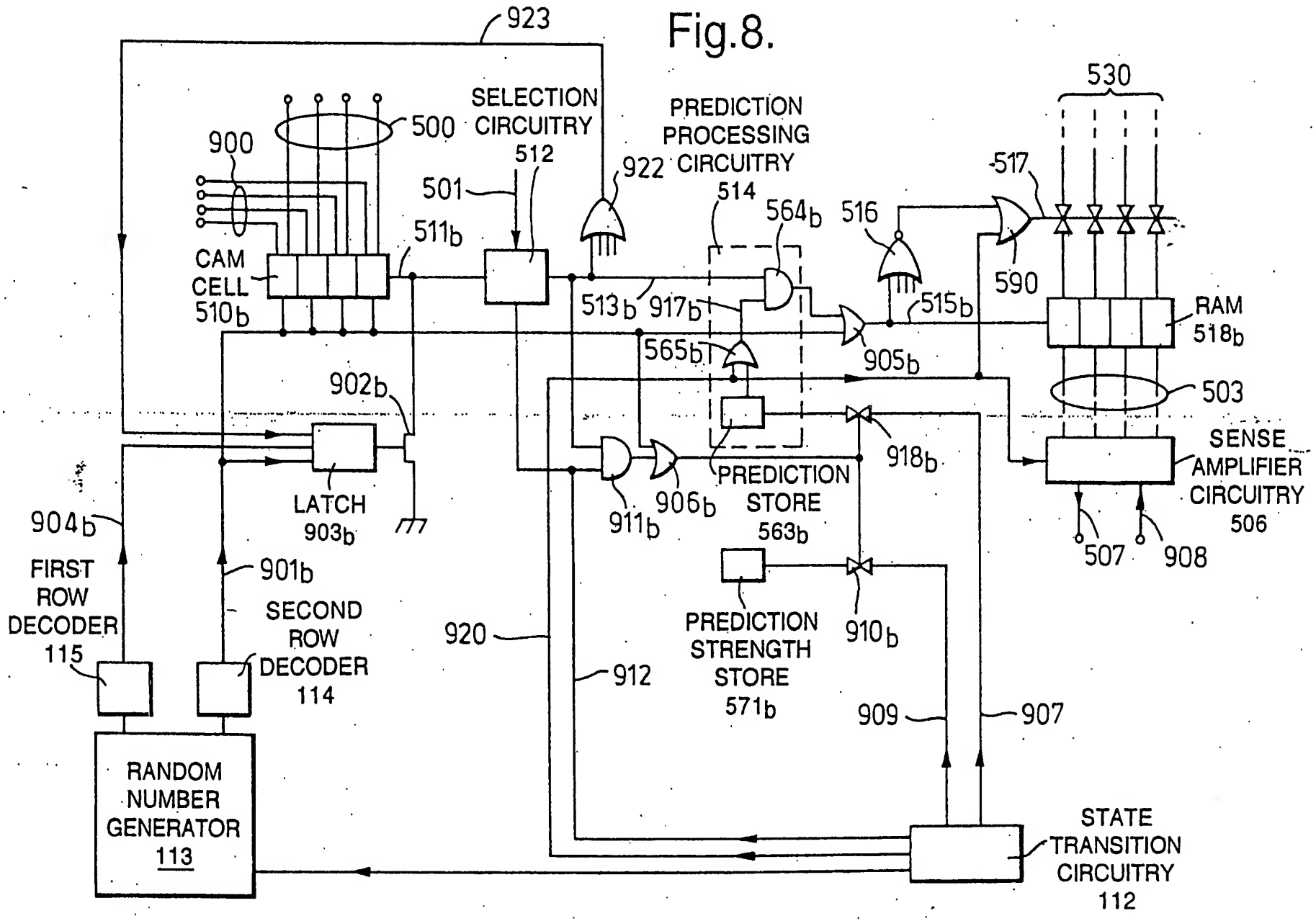
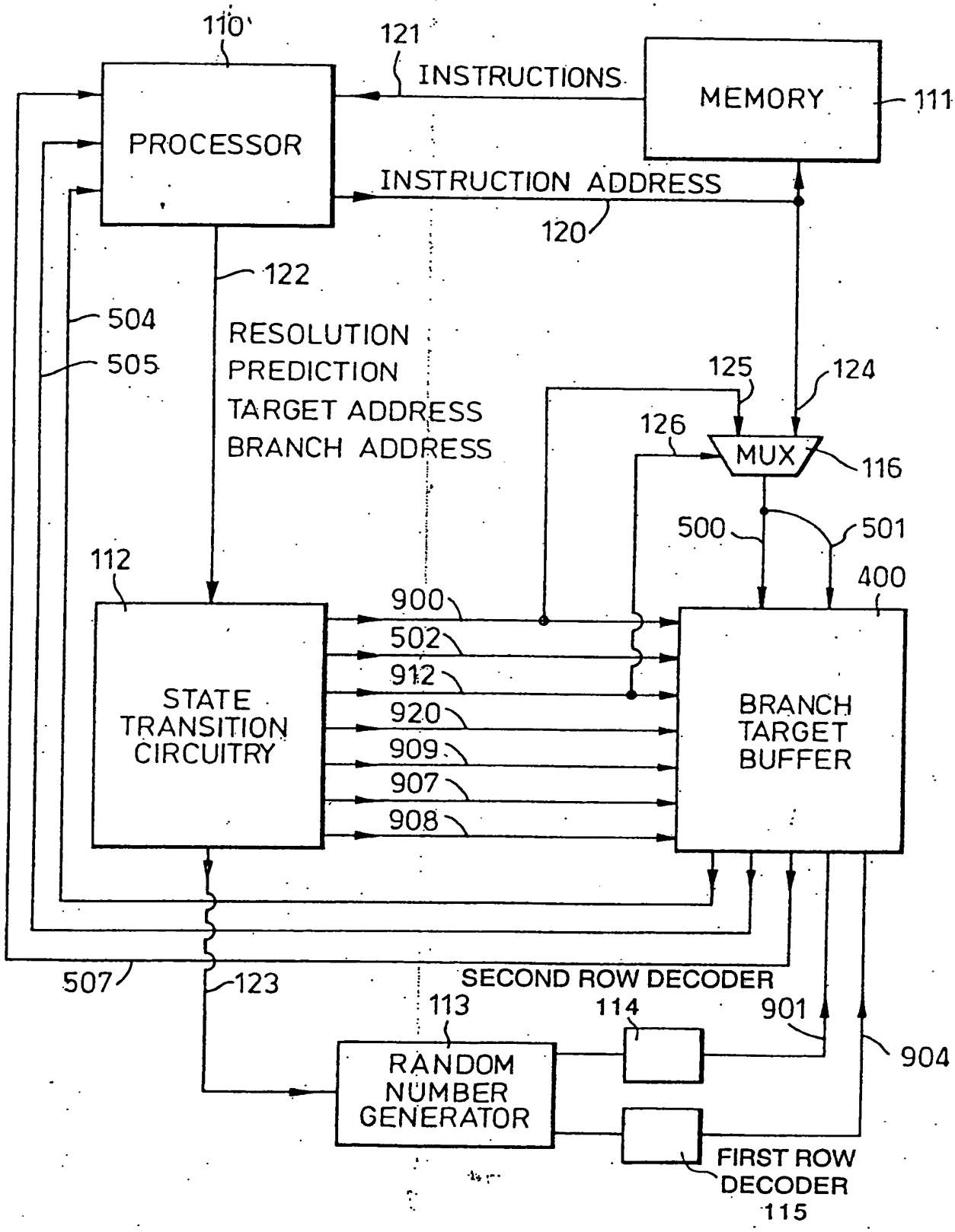

923
530
SELECTION CIRCUITRY
512
PREDICTION PROCESSING CIRCUITRY
514
922
900
500
501
511b
CAM CELL
510b
513b
917b
564b
516
517
590
515b
RAM
518b
565b
905b
503
902b
LATCH
903b
918b
SENSE AMPLIFIER CIRCUITRY
506
911b
906b
PREDICTION STORE
563b
904b
FIRST ROW DECODER
115
901b
SECOND ROW DECODER
114
920
912
PREDICTION STRENGTH STORE
571b
910b
909
907
507
908
RANDOM NUMBER GENERATOR
113
STATE TRANSITION CIRCUITRY
112

Fig.9.


110
121
INSTRUCTIONS
MEMORY
111
PROCESSOR
INSTRUCTION ADDRESS
120
122
504
505
RESOLUTION
PREDICTION
TARGET ADDRESS
BRANCH ADDRESS
125
124
126
MUX
116
500
501
400
112
900
502
912
920
909
907
908
STATE TRANSITION CIRCUITRY
BRANCH TARGET BUFFER
507
123
SECOND ROW DECODER
113
114
901
904
RANDOM NUMBER GENERATOR
FIRST ROW DECODER
115